IN THE CLAIMS

Please cancel Claims 4 and 19.

Please amend Claims 1, 5, 16 and 20 as indicated.

1. (Currently Amended) A catheter system to change the temperature of blood by heat transfer to or from a circulating working fluid, comprising:

a supply lumen to introduce a circulating working fluid to a heat transfer element wherein said supply lumen is substantially straight through the heat transfer element; and

a helical return lumen, helically encircling the substantially straight supply lumen, to extract a circulating working fluid from the heat transfer element, the return lumen having a cross-sectional area greater than the cross-sectional area of the supply lumen to enhance flexibility of the heat transfer element,

wherein the helical return lumen encircles the supply lumen such that blood flows between the helical return lumen and the supply lumen, and wherein turbulence is induced in a substantial portion of a free stream of blood by contact with both the helical return lumen and the supply lumen,

wherein multiple helical return lumens are provided.

2. (Original) The system of claim 1, wherein the heat transfer element is made of a flexible conductive metal.

3. (Previously Presented) The system of claim 1, wherein the heat transfer element is a balloon.

4. (Canceled)

5. (Currently Amended) The system of claim [[4]] 1, wherein three helical return lumens are provided.

6. (Previously Presented) The system of claim 3, wherein the supply lumen and the outlet lumen are made of a flexible material.

7. (Original) The system of claim 6, wherein the flexible material is rubber.

8. (Original) The system of claim 6, wherein the flexible material is a material capable of undergoing inflation.

9. (Original) The system of claim 1, wherein the working fluid is saline.

10. (Previously Presented) The system of claim 3, wherein a length of the supply lumen is between about 5 and 30 centimeters.

11. (Previously Presented) The system of claim 3, wherein a diameter of the helical shape of the return lumen is less than about 8 millimeters when inflated.

12. (Original) The system of claim 1, further comprising a working fluid supply including a pump, and wherein the pump circulates the working fluid.

13. (Original) The system of claim 12, wherein the working fluid supply is configured to produce a pressurized working fluid at a temperature of between about –3°C and 36°C and at a pressure below about 5 atmospheres of pressure.

14. (Previously Presented) The system of claim 3, wherein the return lumen includes a surface coating or treatment to inhibit clot formation.

15. (Original) The system of claim 14, wherein the surface coating or treatment includes heparin.

16. (Currently Amended) A method of providing flexibility in a catheter for use in a system to change the temperature of blood by heat transfer to or from a circulating working fluid, comprising:

providing a catheter including:

a supply lumen to introduce a circulating working fluid to a heat transfer element, wherein said supply lumen is substantially straight through the heat transfer element; and

a helical return lumen, helically encircling the substantially straight supply lumen, to extract a circulating working fluid from the heat transfer element, the return lumen having a cross-sectional area greater than the cross-sectional area of the supply lumen to enhance flexibility of the heat transfer element; and

circulating fluid through the supply lumen and return lumen to change the temperature of the heat transfer element to a temperature different from a patient temperature, to heat or cool the patient.

wherein the helical return lumen encircles the supply lumen such that blood flows between the helical return lumen and the supply lumen, and wherein turbulence is induced in a substantial portion of a free stream of blood by contact with both the helical return lumen and the supply lumen,

wherein multiple helical return lumens are provided.

17. (Original) The system of claim 16, wherein the heat transfer element is made of a flexible conductive metal.

18. (Previously Presented) The system of claim 16, wherein the heat transfer element is a balloon.

19. (Canceled)

20. (Currently Amended) The system of claim ~~19~~ 16, wherein three helical return lumens are provided.

21. (Previously Presented) The system of claim 18, wherein the supply lumen and the return lumen are made of a flexible material.

22. (Original) The system of claim 21, wherein the flexible material is rubber.

23. (Original) The system of claim 21, wherein the flexible material is a material capable of undergoing inflation.

24. (Original) The system of claim 16, wherein the working fluid is saline.

25. (Previously Presented) The system of claim 18, wherein a length of the supply lumen is between about 5 and 30 centimeters.

26. (Previously Presented) The system of claim 18, wherein a diameter of the helical shape of the return lumen is less than about 8 millimeters when inflated.

27. (Original) The system of claim 16, further comprising a working fluid supply including a pump, and wherein the pump circulates the working fluid.

28. (Original) The system of claim 27, wherein the working fluid supply is configured to produce a pressurized working fluid at a temperature of between about 3°C and 36°C and at a pressure below about 5 atmospheres of pressure.

29. (Previously Presented) The system of claim 18, wherein the return lumen includes a surface coating or treatment to inhibit clot formation.

30. (Original) The system of claim 29, wherein the surface coating or treatment includes heparin.

31. (Previously Presented) A method of determining pressure in a catheter for use in a system to change the temperature of blood by heat transfer to or from a circulating working fluid, comprising:

providing a catheter including:

a supply lumen to introduce a circulating working fluid to a heat transfer element; and

a return lumen to extract a circulating working fluid from the heat transfer element;

circulating fluid via a pump through the supply lumen and return lumen to change the temperature of the heat transfer element to a temperature different from a patient temperature, to heat or cool the patient; and

monitoring the pump speed and current drawn by the pump and using the same in a calculation of pressure.

32. (Original) The method of claim 31, further comprising measuring the efficiency of the pump and using the same in a calculation of pressure.